Introduction

- Carbapenemase-producing *Klebsiella pneumoniae* (CPKP) is an emerging pathogen which has the serious clinical infections, high mortality is difficult to control.
- Hematopoietic stem cell transplantation (HSCT) patients are particularly susceptible to multidrug resistant bacteria, especially carbapenemase-producing Enterobacteriaceae.
- CPKP infections are an emerging cause of death after HSCT and the mortality rate has been reported up to 60%.
- The major risk factors of CPKP infections are colonization of organisms before transplantation.

The aims of this study are to assess incidence rate of Carbapenemase-producing *Klebsiella pneumoniae* (CPKP) colonization in HSCT patients, CPKP infection rate, CPKP-related 30-day mortality and to identify the risk factors for infections.

Methods

- This study is a prospective study designed to follow adult HSCT patients in King Chulalongkorn Memorial hospital, Bangkok, Thailand between 1 July 2016 to 31 March 2018 with follow-up clinical outcome of CPKP colonization until April 2018.
- The data collections included the demographic, duration of hospital stay (DOS), anatomical sources of the CPKP isolates, status of CPKP (infection or colonization), and survival outcome.
- In patients that were documented to have CPKP infection, types of infection, the antibiotic susceptibility profile of the isolates and antibiotics treatment were obtained.

Results

- A total of 96 patients were enrolled, which 34 of 96 patients underwent allogeneic HSCT.
- Incidence rate of CPKP colonization in HSCT patients was 22.2% (18/96 patients) and incidence rate of CPKP infections was 5.2% (5/96 patients).
- Both *bla*OXA-48 and *bla*KPC were the most common carbapenemase genes (50%).
- Patients with CPKP infection were more likely in the ICU setting than in the colonization group.
- CPKP colonization was more significantly found in urinary specimens (P = 0.029).
- 5 out of 18 CPKP colonization (27.8%) developed CPKP infection (any site), whereas 13 out of 18 (72.2%) remained colonization without infections.
- The 30-day mortality rate was significantly higher than in the colonization group; 60% (4/5) versus 23% (13/56), (P = 0.047).

Discussion and conclusion

- Our study demonstrated that the incidence rate of CPKP colonization in HSCT at KCMH was 22.2% which is higher than our reported in 2015. (incidence rate 12%).
- In this study we found that the most common carbapenemase genes were *bla*OXA-48 and *bla*KPC, which is similar to the previous reported that both genes were more common in Asia.
- In contrast, *bla*IMP, *bla*KPC, and *bla*VIM were not found in our study because the high prevalence usually occurred in the United States and Europe.
- Most CPKP remained susceptible to tigecycline and gentamicin but since fosfomycin was most often used for the treatment of CPKP infection, the susceptibility was only 40%.
- The infection rate of CPKP was higher than 20%, and that indicated that there was an important problem because the lack of susceptible antibiotics resulted in a high mortality rate.
- There is an urgent need to have a rigorous, multifaceted policy to use appropriate antibiotics and improve infection control.
- In conclusions: CPKP is an emerging pathogen associated with significant mortality in bone marrow transplant patients. Treatment was predominately based on colistin combination therapy.